

# Decision Making and the Levels of War

Thomas H. Killion

**T**RADITIONAL APPROACHES to the decision-making process have employed analytical models that generate and compare options based on weighted features. This is often referred to as multi-attribute decision making. The deliberate procedures developed by the Armed Forces for operational planning—the Joint Operational Planning and Execution System (JOPES)—represent a systematic application of this approach.<sup>1</sup> Figure 1 illustrates the basic components in this approach to the decision-making process.

Recent studies in real-world settings, including tactical commanders in field environments, have led to a different model of the decision-making process.<sup>2</sup> These studies of naturalistic decision making (NDM) have resulted in the development of the Recognition-Primed Decision (RPD) model.<sup>3</sup> The RPD model asserts that decision makers draw upon their experience to identify a situation as representative of or analogous to a particular class of problem. This recognition then leads to an appropriate course of action (COA), either directly when prior cases are sufficiently similar, or by adapting previous approaches. The decision maker then evaluates the COA through a process of “mental simulation.” Figure 2 illustrates the basic structure of the RPD model both in its simplest version and when the decision maker evaluates options through use of mental models.

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In general, RPD reflects the ubiquitous influence of analogy in human perception and problem solving.<sup>4</sup> Such analogical thinking has demonstrated both its positive and negative effects at the highest levels of national security decision making.<sup>5</sup> The emergence of this new model of decision making has direct implications for issues such as training for command, evaluating the expertise of commanders and designing decision-support systems.<sup>6</sup> The model suggests markedly different decision-support systems, focusing on accurate situation assessment and case-based reasoning (recalling similar cases) as opposed to the feature-based comparison of options inherent in systems such as JOPES.

However, one must recognize that both the analytic and the recognitional modes of decision mak-

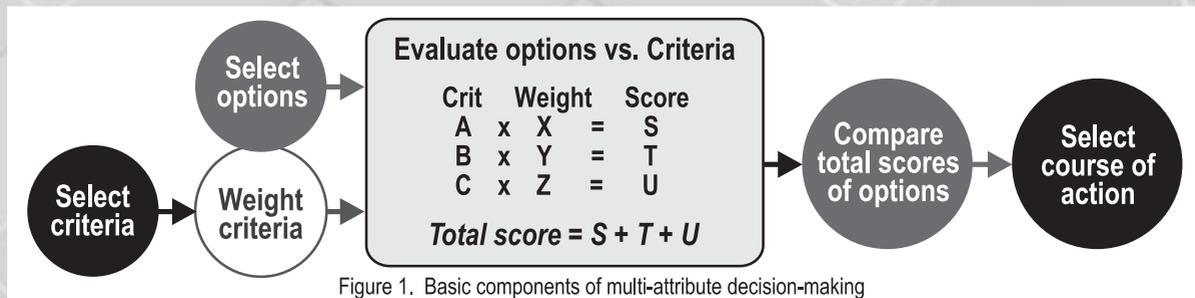


Figure 1. Basic components of multi-attribute decision-making

ing are desirable and, indeed, complementary. In fact, studies of decision making in natural settings have demonstrated that decision makers employ RPD and analytic strategies at different times, depending on the problem situation, their level of experience and other factors.<sup>7</sup>

Figure 3 compares the strengths and weaknesses of the two strategies. The strengths of each approach essentially mirror the weaknesses of the other. As a result, optimal decision making tends to involve some combination of both modes. For example, in operations planning, initial COAs may be generated by the commander based on analogous situations (RPD-based decision making), and the COAs can then be assessed (by the staff) via analytic methods. Conversely, once the staff generates COAs for the commander via analytic methods, recognitional decision making may influence the commander's selection of the one(s) to implement. Figure 4 illustrates these "mixed" modes of military planning, indicating the interdependent and complementary nature of the two approaches.

### Decision-Making Models and the Levels of War

Factors characterizing naturalistic decision-making environments include:

- Time pressure/constraints.

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- Ill-structured problems.
- Uncertain, dynamic environments.
- Shifting, ill-defined or competing goals.
- Multiple event-feedback loops.
- High stakes.
- Knowledge-rich environments.
- High decision complexity.<sup>8</sup>

Each of these factors is present to varying degrees in military planning at the strategic, operational and tactical levels. In general, the strategic and operational levels certainly allow more time and tend to have greater resources for the planning process and thereby favor analytic planning to a greater degree. However, such factors as the increasing pace of warfare, extended battlespace, ability to mass effects and target strategically, near-instantaneous sharing of situational information and the increasing political sensitivity associated with even tactical actions are causing these levels to merge.<sup>9</sup>

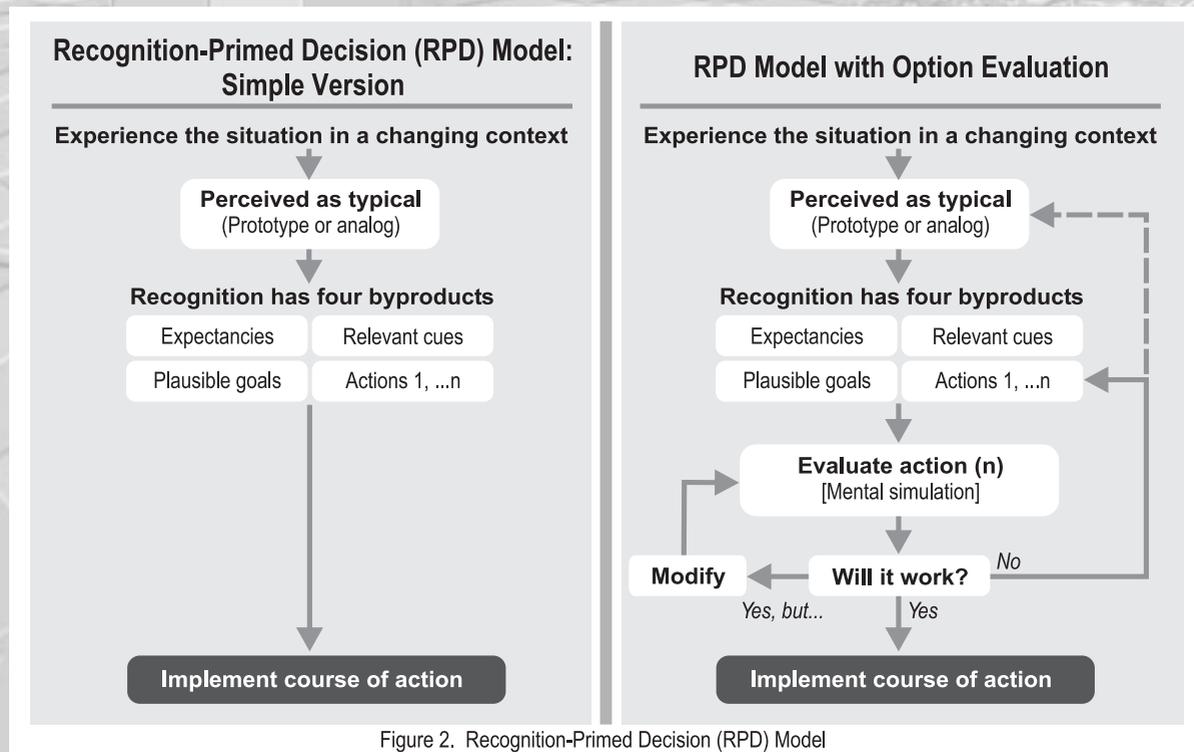


Figure 2. Recognition-Primed Decision (RPD) Model

	Analytic Mode	Recognitional Mode
Strengths	Systematic procedures In-depth course-of-action assessment Detailed comparison of options	Leverages expertise and experience Commander-centered Rapid response Minimal resources required
Weaknesses	Limited effect of expertise and experience “garbage in—garbage out” (relative comparison of options) Dependent on accuracy of scores and weights Resource intensive	Limited analysis of options, if any Shallow assessment of outcomes Potential “garden path” effects Limited number of options considered

Figure 3. Comparison of Analytic and Recognitional Strategies

*Technology is driving the levels of war closer in terms of the capability and ease of applying the two methods. . . . The increasing pace of warfare, extended battlespace, ability to mass effects and target strategically, near-instantaneous sharing of situational information and the increasing political sensitivity associated with even tactical actions are causing these analytical and recognitional levels to merge.*

In addition, technology is driving the levels closer in terms of the capability and ease of applying the two methods. For example, the situational understanding now available at higher echelons and the commensurate ability to visualize the battlespace allow recognitional decision making to a degree

not feasible in the past. Conversely, real-time or faster-than-real-time decision-aiding technologies allow COA analyses at the tactical level to a degree not possible previously, enabling more effective analytic planning and replanning. As a result of these factors, these two complementary modes of decision making will likely become increasingly interwoven and interdependent. Selecting the dominant mode of operations will depend on both situational factors, such as time constraints and size/makeup of staff, and personal ones, including decision-making style, level of expertise and management style.

### Implications

Significant implications of the merging levels of war and the supporting technologies affect training and systems design. In the training arena, commanders

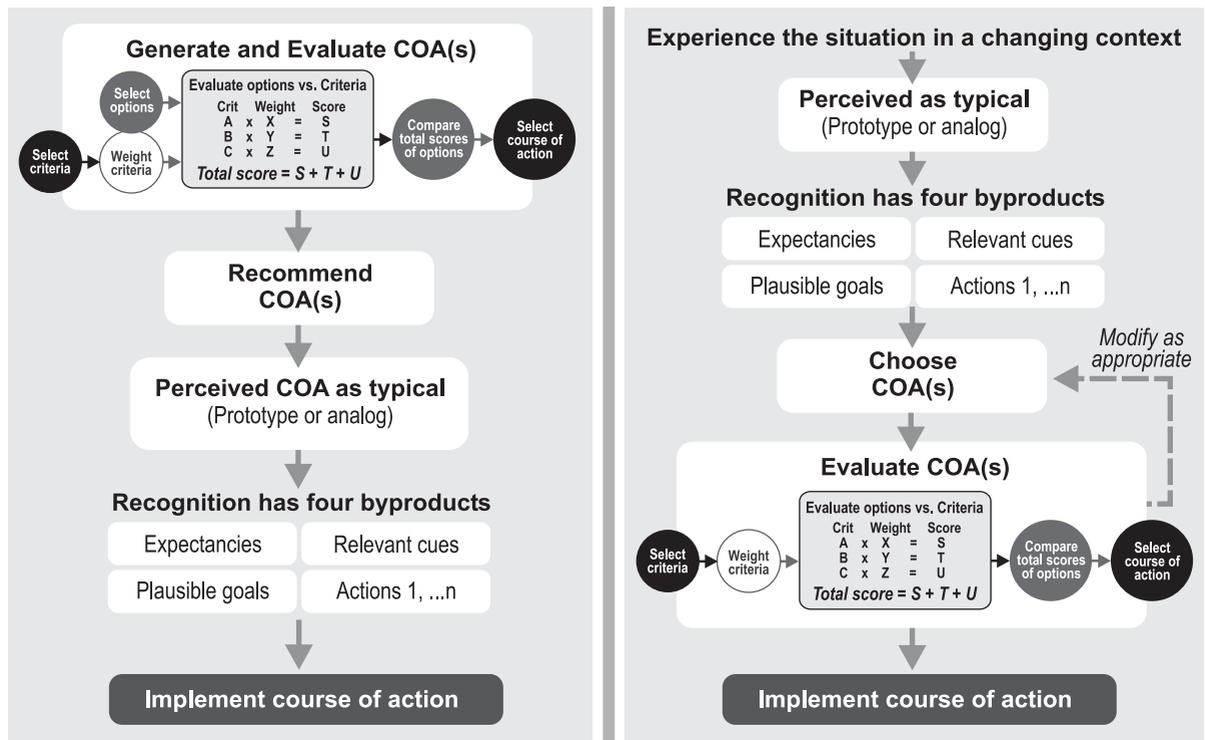
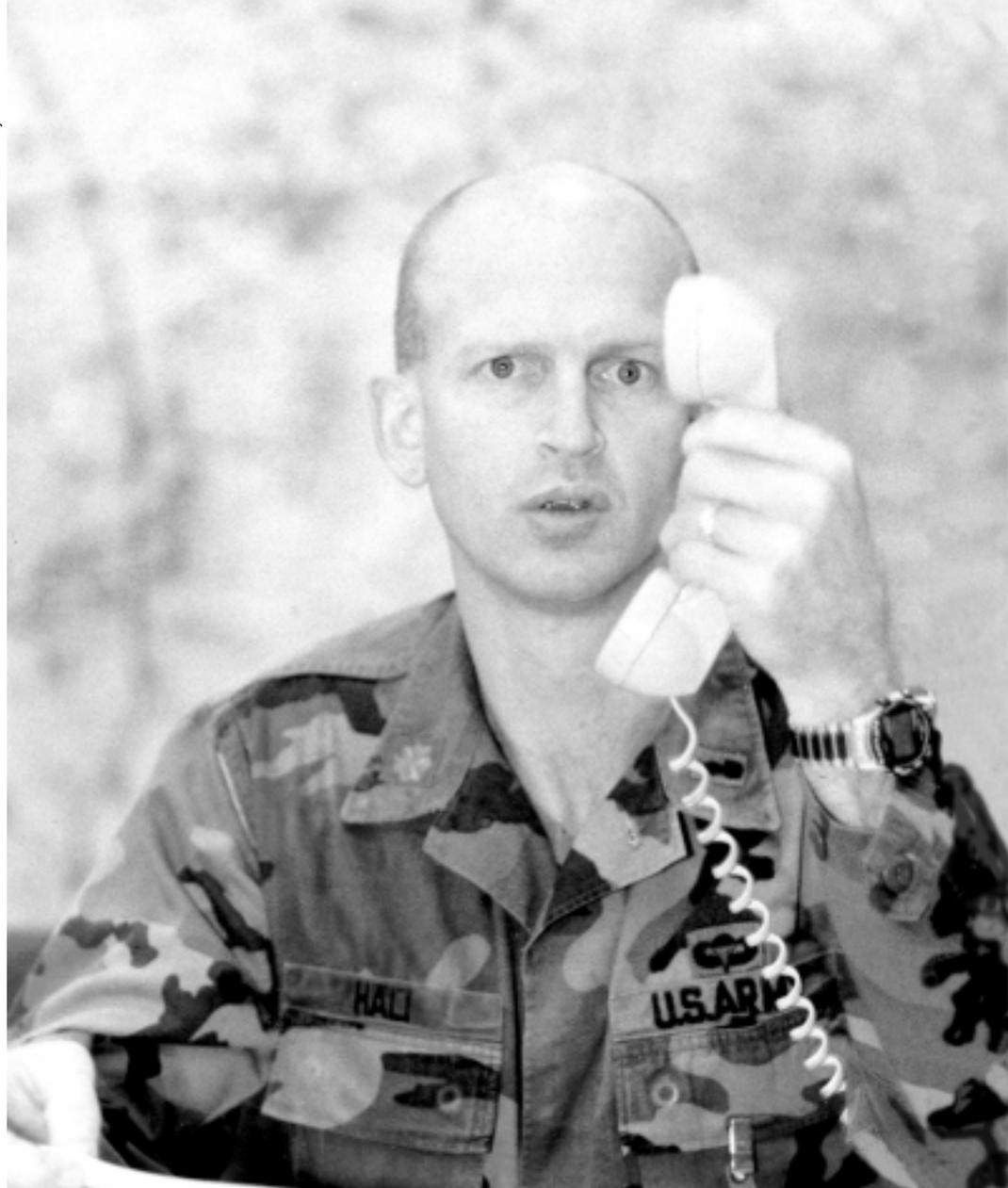


Figure 4. “Mixed” modes of planning/decision-making

and staff personnel must be trained to employ both analytic and recognitional decision-making strategies appropriately, either singly or in some integrated form. This dual application will require changes to current training practice, which emphasizes analytic planning.<sup>10</sup> With regard to systems, future military planning and decision-aiding systems must be flexibly designed to support both decision-making modes. This design will require databases and decision aids that can interactively adapt to the desired mode and display methodologies optimized to select and format information compatible with the task at hand and the preferred strategy.

The importance of incorporating such capabilities has been most clearly demonstrated in past failures to design systems to be compatible with the information-processing and decision-making characteristics of the operator or user. For example, in-depth analyses of the incident in the Persian Gulf involving the shooting down of an Iranian commercial airliner by the USS *Vincennes* identified a number of key problems with the design of the human-system interfaces that contributed to the error. One author discussing the *Vincennes* incident maintains that “the system was poorly suited for use by human beings during rapid military action.”<sup>11</sup> He says a human-machine mismatch occurs between modern computer systems, which can process and display information at phenomenal



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rates, and the “comprehension capability of users, which has remained almost static for thousands of years.”<sup>12</sup>

Similar problems have been identified in significant incidents in the nuclear power industry, such as Three Mile Island.<sup>13</sup> Emerging approaches to decision making offer the potential for increased understanding of such errors and for mitigating the factors that contribute to them.

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Less dramatic, but no less significant, is the Army experience at the National Training Center (NTC), Fort Irwin, California, with a Force XXI Advanced Warfighting Experiment (AWE). The AWE was to assess the impact of advanced digitization, technology and newly developed doctrine on the capabilities of the 1st Brigade, 4th Infantry Division (the Army's Experimental Brigade) in engagements with the NTC's Opposing Force (OPFOR). Results of the AWE demonstrated both the advantages and limitations of state-of-the-art digital communications technology. As Graham describes it, "At the core of the new design is what the Army calls its computer applique system, a tactical intranet that pro-

vides commanders with situational awareness, the ability to see on video displays the location of forces in the field, artillery postures, aviation and air defense activity, intelligence estimates, supply levels, weather reports and even live news broadcasts. Simply by touching a keyboard, a commander can direct troop movements or order fire, and a gunner on the battlefield can relay reports or requests.

Army planners expect the tactical intranet to have profound implications for the rhythm and tactics of battle. For instance, the ability to know the location of friendly and enemy forces as a fight unfolds should permit advancing infantry units to disperse more widely and move more quickly across a battlefield, accelerating the pace of battle. In turn, this speed will require commanders to revise cumbersome procedures for issuing orders, which now involve the time-consuming preparation of staff estimates and options."<sup>14</sup>

To assure these advanced information technologies provide maximum benefit to the user, the Army needs to incorporate the types of adaptive decision-aiding capabilities discussed above. These technologies will achieve their optimal effectiveness only if they are compatible with the cognitive capabilities and limitations of the commanders, staff and soldiers who will use them. **MR**

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#### NOTES

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